The Journal

OF

The Kansas Medical Society.

Published Monthly by The Kansas Medical Society.

Address all matters for publication and all communications to office of publication, W. E. McVey, M.D., Recording Secretary, 625 Kansas Avenue, Topeka, Kansas.

Subscription Price, $1.00 Per Annum.

Vol. I. Topeka, Kansas, February, 1902. No. 9.

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PAPERS OF THE THIRTY-FIFTH ANNUAL SESSION.

HISTORY OF EXPERIMENTAL INVESTIGATIONS CONCERNING THE INFLUENCE OF ALCOHOL AND ALCOHOLIC DRINKS ON THE FUNCTIONS AND STRUCTURES OF THE LIVING BODY BY AMERICAN INVESTIGATORS.

BY N. S. DAVIS, M.D., CHICAGO, ILL.

Read by title at Pittsburg meeting.

So far as my knowledge extends, the first experimental investigations concerning the effects of alcohol on the living body in this country were devised and executed by me during the last half of the year 1850. They constituted part of a more extended inquiry concerning "the influence of different kinds of food and drink on the functions of calorification and respiration, as indicated by the changes of temperature and the variations in the quantity of carbonic acid gas exhaled during expiration in the healthy human system; and the changes which the several constituents of the blood undergo in their relative proportions during the passage of that fluid through the secreting organs and some of the non-secreting structures of the human body." The results of the whole inquiry were embodied in an essay read by me in the annual meeting of the American Medical Association, in Charleston, S. C., May, 1851, under the following title: "An Experimental Inquiry Concerning Some Points in the Vital Processes of Assimilation and Nutrition." The facts and deductions set forth in the essay were listened to with marked attention, but were so much at variance with the popular doctrines of the day that I received only a vote of thanks, without a reference of the paper for publication in the transactions of the Association. It was published, however, in the North-Western Medical and Surgical Journal, Chicago, September, 1851, Vol. 4, pages 169-190. It should be noted that the experimental inquiry under consideration was executed less than nine years after the publication of the celebrated essay of Baron Liebig, in 1842, on "Organic Chemistry in its Relations to Physiology and Pathology," which was the real foundation of modern organic or physiologic chemistry.

On strictly theoretical grounds he divided all food, or ingesta, into two classes, called carbonaceous and nitrogenous. In the first he included the articles composed chiefly of oils or fats, starch, and sugar, and the alcohols. In the second he included those composed of vegetable and animal albumen, fibrin, etc. As those belonging to the first were composed essentially of only the three elements, oxygen,

hydrogen, and carbon, they were regarded as incapable of entering into the nutrition or growth of the organized structures of the body; but were supposed to unite with the oxygen furnished through the lungs, and to be converted into carbon dioxide and water with the evolution of heat, to sustain the temperature of the living body, or deposited in the form of fat in the tissues. Consequently they were very generally designated as "respiratory food;" and alcohol was placed at the head of the list. Those articles belonging to the second class being composed of the four elements, oxygen, hydrogen, carbon, and nitrogen, were regarded as the only ones capable of assimilation and of entering into the nutrition and growth of organized structures. The classification was so simple, and the theory on which it was based so plausible that it was almost universally accepted and quickly incorporated into all our literature, both medical and secular. Lehman, however, a contemporary of Liebig, and eminent as a chemist, denied the correctness of the latter's chemico physiologic doctrines. While a student of medicine, the subject of animal heat and its connection with the respiratory function attracted my attention, and a discussion of the subject constituted my graduate thesis in 1837. When, five years later, the important essay of Liebig made its appearance, I read it with much interest, and during the next few years I met with so many apparently well authenticated facts not in harmony with his claim that foods composed essentially of fat, starch, sugar, and the drinks containing alcohol were simply oxidized and converted into carbonic acid, water, and heat in the living body, that I planned and executed the "Experimental Inquiry" of 1850 51. It embraced five distinct series of observations and tabulated records.

The first was instituted for the purpose of ascertaining the temperature and the amount of exhaled carbonic acid in a healthy adult man at 7 A.M., before breakfast; at 10 A.M., two hours after breakfast; at 12 M. before dinner; at 3 P.M., two hours after dinner; at 5 P.M. and at 8 P.M., two hours after supper, while living on an ordinary mixed diet of vegetable and animal food. The objects sought were to ascertain the variations of temperature before the regular meals and when digestion was in its most active stage, and the average for the twenty-four hours, and the same in regard to the proportion of carbon dioxide exhaled. The observations on a mixed diet were continued more than two weeks. The second series consisted of the same detailed observations on the same individual while limited during three full days to a diet consisting of pure boiled rice with a little white sugar. After a return to a mixed diet for a week, the same individual was limited for three days to a diet consisting exclusively of egg

albumen and a very small amount of dried beef, and the same detailed observations were made as in the second series. We thus gathered the data concerning the temperature and exhaled carbon during an ordinary mixed diet, one exclusively carbonaceous, and one equally exclusively nitrogenous.

They all showed the lowest temperature in the morning, before the breakfast; an increase of from 1° to 2.5° F. after each meal, reaching the maximum about two hours after a 1 o'clock P.M. dinner. The average temperature for the twenty-four hours was 0.5° F. less under the strictly carbonaceous diet than either the mixed or that exclusively nitrogenous. The proportion of carbon dioxide in the exhaled atr also varied, but not strictly parallel with the variations of temperature. Under the carbonaceous diet the proportion of exhaled carbon reached its maximum about 12 M., under the mixed diet about 3 P.M., and under the nitrogenous not until 7 P.M.

The fourth series of observations were made on the same individual under the influence of alcohol, and with the same apparatus. Having learned from the preceding experiments that the temperature of the body was uniformly increased during the active digestion of ordinary food, the time chosen for testing the effects of alcohol was from 9 P.M. to 12 P.M., the supper having been taken at 6 P.M., and consequently its digestion completed before the alcohol was taken. In a room well aired and kept at a comfortable and uniform temperature, at five minutes before 9 P.M. the temperature, proportion of carbon dioxide in the exhaled air, and pulse rate were noted, and at 9 P.M. four ounces of brandy diluted with water were taken at once. At 9:45 P.M., the pulse rate had increased ten beats per minute, the proportion of exhaled carbon dioxide diminished, but the temperature had remained the same. At 10 P.M. the pulse rate was only five beats faster than natural, and exhaled carbon was further diminished, and the temperature slightly less. At 11 P.M. the pulse rate had returned to its natural standard, the temperature had decreased 0.2° F., and the amount of exhaled carbon had perceptibly increased. At 12 P.M., three hours after the alcohol was taken, the temperature had fallen 0.5° F., and the proportion of carbon dioxide in exhaled air was the same as when the experiment began.

On another evening this experiment was repeated with the same results. During the first two hours after taking the alcohol there was a sensation of exhilaration or dizziness in the head, a sense of lightness or less consciousness of body weight, and less tactile sensibility in the hands and feet. Previously to the foregoing experiments, Dr. Prout, of London, had shown that the presence of alcohol in the system

diminished the exhalation of carbon dioxide, and his observation had been corroborated by MM. Bouchardet and Sandras, but they did not note the effect on the temperature at the same time. The result of all these experiments "compelled me to suppose that all digestible substances, whether carbonaceous or nitrogenous, are assimilated and appropriated with more or less facility to the nourishment of the organized textures of the body;" and "that the carbonic acid from the respiratory process, like the secretions from the skin and kidneys, is a true product of the disintegration or metamorphoses of the structures of the body, while the temperature depends directly on those changes that take place in the nutritive and organic actions." [See N. W. Med. and Surg. Journal, Vol. 4, p. 180.]

In October and November, 1852, I repeated the experiments with alcohol in the form of both brandy and wine, in connection with Dr. Henry Parker, then a resident of Chicago.

The same precaution was taken to avoid having the action of the alcohol complicated by the presence of ordinary food in the stomach at the same time, as in the previous experiments. Oct. 18, 1852, at 8:30 p.m., the temperature under the tongue was 98¼° F., pulse 76 per minute, respirations 17. Three ounces of brandy were then taken, diluted with water, the temperature of the room being kept uniform at 70° F. Thirty minutes later the temperature was 98° F., the pulse 84, respirations 17. In thirty minutes more or one hour after the brandy had been taken, the temperature was 97¾° F., pulse 77, respirations 17. Two and a half hours after the brandy, the temperature had fallen to 97½° F., pulse to 75, and respirations to 16. Directly before taking the brandy, and at the end of every half hour, a given quantity of exhaled air was collected in a graduated glass tube over mercury, and then transferred to a solution of caustic potash. The quantity of carbon dioxide markedly decreased during the first two and one-half hours, and then slowly returned to the same amount as before the experiment began. On Nov. 8, 1852, the foregoing experiment was repeated with the same apparatus and regulations, except that the alcohol was taken in the form of eight ounces of port wine instead of three ounces of brandy. The effects were the same in kind and nearly the same in degree. In both, the sensations recorded were those of dryness in the mouth and fauces, a feeling of exhilaration and some dizziness in the head, some general feeling of numbness or lack of sensibility throughout the whole system, and a sense of heat in the stomach and face. These various sensations continued for nearly three hours, after which they slowly disappeared. The experiments with alcohol in October and November,

1852, were included by Dr. Henry Parker in his "Prize Essay on the Difference between Stimulants and Tonics," presented to the Illinois State Medical Society at its annual meeting in La Salle, June, 1854, and published in the Transactions of the Society for that year, pages 55 107. A careful noting of all the experiments thus far noticed will show that the physiologic effects of such hydro-carbons as starch, sugar, and oils on the living body, and those of the alcohol class are radically different.

The first when taken were digested, assimilated, and maintained the full natural temperature, pulse rate, and exhalation of carbon dioxide with no disturbance of the nervous, cerebral, or metabolic functions, while the alcohol was plainly imbibed from the stomach undigested, circulated with the blood, directly diminishing nerve and cerebral sensibility like other anesthetics or narcotics, and decreasing both temperature and exhaled carbon. Consequently the classing o it with other carbonaceous foods as a supporter of respiration and animal heat was erroneous, and led to very important errors in practice, some of which still exist. For instance, the observed fact that the daily use of moderate doses of alcohol, as a mug of beer or a glass of wine three or four times a day, generally increased the amount of fatty tissues, and the experiments of Bœcker, of Germany, showing that moderate doses of alcoholic liquor lessen the sum total of eliminations, and cause increased weight, gave rise to the inference that such use of alcohol might prevent the development of tuberculosis and other diseases characterized by persistent emaciation, and arrest or retard their progress after they had commenced.

The inference was sanctioned by some eminent medical men, and consequently cod-liver oil and Bourbon whiskey soon became the most popular remedies for both the prevention and cure of pulmonary tuberculosis at the middle of the present century. To test the correctness of this doctrine by as near experimental methods as possible, I began early in 1855 to take notes of every unmistakable case of pulmonary tuberculosis coming under my observation, both in hospital and private practice, a reliable history of which I could get extending back one year or more before any symptoms of the disease had commenced. During that year I gathered the history of thirty-seven cases and made them the basis of my address as President of the Illinois State Medical Society, at the annual meeting in Vandalia, June 4, 1856, which was published in the Transactions of the Society for that year. During the succeeding four years the number of my cases was increased to 210; and a pretty full account of them was embraced in a paper read in the Section on Practice of Medicine at the

annual meeting of the American Medical Association in New Haven, Conn., June 5, 1860, and published in the Transactions of the Association for that year, Vol. 13, pp. 565-676. Of the 210 cases, 140 were males and 70 females; 85 were natives of Ireland; 60 of the United States; 25 of Norway and Sweden; 20 of Germany, and 15 of England, Scotland, and Wales. Of the whole number, 68 had used some form of alcoholic drink, fermented or distilled, almost daily for from one to twelve years before any symptoms or signs of tuberculosis were noticed. Some had drunk only beer at the rate of three or four glasses a day; others drank chiefly wine, and a larger number all kinds of liquor. All were thus habitual drinkers, yet only 15 were recognized as drunkards, 5 of whom were admitted into the hospital with delirium tremens. The number who had used alcoholic drinks periodically or irregularly, and were regarded as moderate drinkers was 91, while 51 were total abstainers from all alcoholic liquors. Of those patients who remained under observation until death, belonging to the first class, the average duration of the disease was only 19 months; of those of the second class, 23 months; and those of the third class, 25 months. Many of those belonging to the first class or division of habitual drinkers were in such circumstances and with such habits as were as favorable for testing the influence of alcohol on the development of tuberculosis as could have been devised. But instead of affording any evidence of exerting any preventive or retarding influence, the use of alcohol appeared both to favor the attacks of the disease, and to hasten the fatal termination. This conclusion is also sustained by the Fiske Prize Essay of Dr. John Bell, of New York, published in the American Journal of the Medical Sciences, in 1859.

In 1857 Dr. Wm. A. Hammond, then a member of the medical staff of the U. S. A., presented an essay to which was awarded a prize by the American Medical Association, and which contained a detailed account of his experiments with albumin, starch and gum as food. He confined himself for ten consecutive days to a diet of albumin and water. After an interval, during which he used an ordinary diet, he confined himself for ten days exclusively to starch and water, taking a given quantity at each mealtime. Among his conclusions concerning the effects were the following: "That albumin may be assimilated into the system in such quantity as to furnish a sufficiency of both nitrogen and carbon to the organism;" and "that starch can be assimilated by the absorbents in more than sufficient quantity to sustain the respiratory function." This last conclusion was proved by the fact that during the ten days of living on starch there was no loss

of body weight and an increase of 1.8° F. of temperature; while during the ten days of albuminous diet, there was more than five pounds loss in body weight, and no loss of temperature.

During the last three days of the experiment with albumin the urine became albuminous, and during the same stage of progress with starch the urine became saccharin, with other symptoms of diabetes. Subsequently Dr. Hammond experimented with alcohol, first on the dog, and later upon himself. When alcohol diluted with water was introduced into the stomach of the dog, it was rapidly absorbed and easily detected in the blood, the various organized structures of the body, in the urine, and in the exhalations from the lungs or air passages. When he gave the dog only very small doses, and very largely diluted, as in the weaker wines, he was not able to detect it in the organized structures, but still detected it in the pulmonary exhalation with the aid of a solution of bichromate of potassa in sulphuric acid. He also executed three series of experiments with alcohol on himself. Instead of attempting to determine the effects of living on alcohol and water alone for several days, as with albumin, starch, etc., he first took four drams of alcohol diluted with an equal quantity of water at each meal for five consecutive days. The quantity of his ordinary food had been found just sufficient for the needs of the system without loss or gain in weight. Note was taken of the total amount of ingesta and of excreta each day, the body weight, etc. During the five days the amount of carbon dioxide and water exhaled from the lungs was diminished; the urine was also decreased, both in quantity, and in solid constituents; the pulse was increased in frequency, and there was decided headache, with a sense of heat in the surface, and marked indisposition to exertion either mental or physical. Yet at the end of the five days he had gained in weight nearly half a pound.

His second experiment was with the same quantity of alcohol for the same length of time, but with an ordinary diet so much limited in quantity as to cause a daily loss in weight of one quarter of a pound and a general sense of weakness. The alcohol lessened his sense of hunger and weakness, and produced less headache, but caused the same decrease of excreta, and an increase in weight. The third experiment was with the same quantity of alcohol at each meal with a quantity of ordinary food in excess of the natural requirements of the system. This resulted in the same decrease of pulmonary, renal, and other excretions, and increase in body weight, while the headache, frequency of pulse, and general indisposition were more marked than in the first experiment. A full account of the foregoing experiments by Dr.

Hammond may be found in his volume entitled "Physiological Memoirs: Treatise on Hygiene," published in 1863. Notwithstanding the plain evidences of a direct anesthetic effect of the alcohol on the whole nervous structures of the body, his only important inference was that the alcohol united rapidly with the free oxygen in the blood, thereby evolving carbon dioxide, water, and heat, and to that extent conserving the tissues. Consequently he still called it erroneously accessory or indirect food, instead of a paralyzer of nerve sensibility and of tissue metabolism, which was really the effect it produced. Regarding the experiments I executed in 1850 and 1852 and directly corroborated by those of Dr. Hammond, as positively proving that alcohol, when taken into the living body, reduces temperature, nerve sensibility, and all metabolic changes in direct proportion to the quantity taken, it was still claimed that in small doses it exhilarates the mind and quickens the movements of the heart, and consequently it must be a cardiac and cerebral stimulant. With the hope of getting some explanation of this apparent incongruity, in April, 1867, I instituted two additional experiments in which I sought more exact knowledge of the effect on the circulation by using the sphygmograph.

On April 6, 1867, four hours after dinner, when stomach digestion had been completed, the temperature was carefully noted by the thermometer under the tongue; the rate of pulse and other qualities as indicated by the sphygmograph were recorded. Then four ounces of Bourbon whiskey were taken diluted with water. The same observations in regard to temperature and conditions of the pulse were made and recorded every half hour, until two full hours had passed. A series of observations in all respects similar were made on April 11, except for the whiskey, four ounces of sherry wine were substituted. The several sphygmographic lines were preserved as a part of the record. It will be seen that under the influence of the whiskey the temperature diminished three fourths of a degree Fahrenheit in one hour, while under the influence of the same quantity of wine, it diminished one half a degree in the same length of time.

Under the influence of whiskey the rate of pulsations fluctuated, increasing during the first hour from 83 to 89, and decreasing during the second hour from 89 to 85 per minute. Under the influence of the wine the rate steadily decreased from 78 to 71 per minute. The qualities of the pulse, as indicated by the sphygmograph, are the same in kind, differing only in degree in the two experiments.

The lines show that each pulse expands the artery to a greater extent and more abruptly than before the alcoholic liquor was taken, and that the commencement of contraction is equally sudden, while

the whole line becomes more wavy or irregular; thereby much resembling the pulse lines when the arterial coats are weakened by fatty degeneration, or as in such diseases as typhoid and typhus fevers. This indicates relaxation of the vessels from diminished action of the vasomotor nerves and consequent retardation of the blood currents. The inference placed on record at the time is as follows: "The presence of alcohol in the blood interferes with normal vital affinities and cell action in such a manner as to diminish the activity of nutrition and disintegration, and consequently to diminish the dependent functions of elimination, calorification, and innervation; thereby making alcohol a positive organic sedative instead of a diffusible stimulant, as is popularly supposed, in and out of the profession." [See Chicago Medical Examiner, September, 1867, Vol. 8, pages 522 526.] In 1882 83, Professor Martin, of Johns Hopkins University, planned and executed a very ingenious series of experiments to determine the action of alcohol directly upon the heart of the dog. Having rendered the dog unconscious, and isolated the heart and lungs from nervous connection with the brain and spinal cord, he caused the heart to be supplied with blood containing alcohol in proportion varying from one eighth to one per cent. Further details would occupy too much space, but his results I give in his own words as follows: "Blood containing one eighth per cent. by volume of absolute alcohol has no immediate action on the isolated heart. Blood containing one-fourth per cent. by volume, that is, two and a half parts per thousand of absolute alcohol, almost invariably diminishes remarkably, within a minute, the work done by the heart; blood containing one-half per cent. always diminishes it, and may even bring the amount pumped out by the left ventricle to so small a quantity that it is not sufficient to supply the coronary arteries." His experiments demonstrated also that under the influence of the alcohol the heart became so much dilated that the ventricles failed to empty themselves completely by each systole. An interesting account of his experiments was communicated to the Medical and Chirurgical Faculty of Maryland, in 1883, and published in the Maryland Medical Journal for September, 1883. The same was copied into the Journal of the American Medical Association, Vol. 1, pages 307, 308.

In 1889 90, Dr. Edward T. Reichert, Professor of Physiology in the University of Pennsylvania, aided by an improved calorimeter for determining the rate of both heat production and heat dissipation with the actual temperature of the animal, performed eighteen experiments on dogs. Each experiment was continued six consecutive hours after the administration of a given quantity of alcohol proportioned to th

weight of the animal. In sixteen of the eighteen experiments the average heat dissipation was diminished, in a less ratio, however, than the diminution of heat production, and the actual resulting temperature of the animal was lowered. In only two cases was the resulting temperature slightly increased. [See Therapeutic Gazette, Feb. 15, 1890]. The experiments of Professor Martin were repeated by Hammerter [Johns Hopkins University Biolog. Lab. Stud., November, 1889] and his conclusions sustained, but Egleton [University Med. Mag., September, 1890] and Gibbs, by varying the mode of injecting, concluded that small doses produced both increased frequency of pulse and increase of blood pressure, but only of very temporary duration, while large doses lessened both.

One of the most important experimental investigations concerning the "Physiological Actions of Alcohol" is that of Dr. David Cerna, of the Medical Department of the University of Texas, as given in his paper published in the "Transactions of the Pan-American Medical Congress," Vol. 1, pp. 396-429.

His experiments were conducted on frogs and dogs, and were specially designed to ascertain the effects of alcohol upon the peripheral nerves, on the circulation of the blood, on respiration, on body metabolism, on animal heat, and on digestion. He records five experiments on frogs, three with small doses which produced slight and temporary increased reflex action, and two with larger doses that directly diminished the reflex and finally destroyed life. He says that in frogs thus killed by alcohol, "the nerves respond to electric stimulation very slightly or none at all." For testing the effects on the circulation eleven experiments on dogs are recorded, in which 20 and 25 per cent. solutions of alcohol were used as injections into the general circulation either through the external jugular or femoral vein. When the quantity of alcohol injected was small, there was shown an increase in both frequency of pulse and blood pressure, continuing from five to twenty-five minutes, followed by a decline of both. When larger quantities were used, both pulse and pressure were diminished from the beginning. In many of the foregoing experiments the effect on respiration was noted, and six additional ones are recorded, in two of which the vagi nerves were severed. The record shows that in all the experiments the respirations were, from the beginning, diminished in frequency and depth and "giving rise to a lower quantity of air passing in and out of the lungs, than in normal conditions." This effect the experimenter attributes to the direct depressing influence of the alcohol "on the respiratory centers in the medulla oblongata."

In regard to body metabolism and digestion, Dr. Cerna records no additional experiments, and only few concerning animal heat, but refers freely to experiments by others, from which he concludes that "the drug [alcohol] lessens the excretion of tissue waste, both in health and disease."

In 1893, Dr. J. H. Kellogg, of Battle Creek, Mich., in a paper read at the annual meeting of the American Medical Temperance Association in Milwaukee in May, and subsequently published in the Medical Temperance Quarterly, July, 1893, in which he gave a summary of the results of numerous experiments to determine the influence of alcohol on nerve sensibilty, cerebral sensibility or mental action, on muscular co-ordination, on muscular strength, and on digestion. In determining the first three objects he used the chronometer designed by Virdin, of Paris; in the fourth he used a mercurial dynamometer of his own devising; and his observations regarding digestion were based on no less than 2,000 analyses of the contents of the stomach after a test breakfast. His conclusions were as follows: "From the facts above given, it may be fairly concluded that the results of the administration of 1 oz. of alcohol internally, are (1) to diminish nerve activity; (2) to diminish cerebral activity; (3) to impair the co-ordinating power of the brain; (4) to lessen muscular strength; (5) to decrease digestive activity to a notable extent." The only apparent exception noted was in relation to muscular strength. When the test applied within the first fifteen minutes after the alcohol was swallowed, it showed a slight increase of strength, but after one or two hours it was always diminished.

Dr. Kellogg, in a brief paper read in the Section on State Medicine, at the annual meeting of the American Medical Association in May, 1895, gave the results of experiments showing the effects of alcohol on the quality of the urine; it having been clearly proved by Bouchard and Rodgers that urine from healthy subjects contained several toxic ingredients besides its urea. Dr. Kellogg first found the quantity of urine from a man in good health that was required to kill a rabbit of given weight. Then giving the man 8 ounces of brandy and receiving the urine passed during the first eight hours he found that its toxicity to rabbits has diminished one half. The toxicity of that passed during the second 8 hours was not diminished quite so much, while that passed during the third 8 hours had regained nearly the same degree of toxic effect as before the brandy had been taken. More direct or positive proof that the presence of alcohol in the healthy living human system directly diminishes the activity of the kidneys in

eliminating the toxic elements derived from tissue metabolism or bacteriological ptomains, could not be furnished.

In 1894 Dr. Chittenden, of Yale University, reported that the urine of dogs kept under the influence of alcohol for eight or ten days, contained 100 per cent. more uric acid than in the natural condition.

The American Journal of Medical Sciences, 1896, contains the full report of an interesting investigation concerning "the influence of alcohol and alcoholic drinks upon the chemical processes of digestion," by Drs. Chittenden and Mendel of Yale. The experiments were not conducted during digestion in the living stomach, but in laboratory apparatus, in which the digestive fluids were allowed to act upon various food substances of the proteid class under definite and constant conditions. Nineteen experiments were made with absolute alcohol, and twelve with pure rye whiskey, in proportions varying from 0.5 to 6 per cent. When the proportion of alcohol added to the digestive liquids was less than two per cent. the digestive activity was slightly increased in many cases, but not in all. When the proportion of alcohol was two per cent. or more, the digestive activity was uniformly decreased in direct ratio to the quantity used.

Their experiments with brandy, rum, and gin, showed in all cases decreased digestive action. They also executed many experiments with sherry and claret wines; with ale, porter, and lager beer. In eight experiments with sherry wine the digestive activity was decreased in all but one. In six with claret in which the proportion of wine was two per cent. or less, the digestive action was decreased in three, very slightly increased in two, and no change in one. When the proportion of claret was increased to three per cent., decreased activity was shown in every case. And the same was true in all the experiments with ale, porter, and lager beer. C. F. Hodge, Ph. D., professor of physiology, in Clark University, made a report in the Popular Science Monthly for March and April, 1897, detailing three series of "Experiments on the Physiology of Alcohol." One series was designed to test the influence of alcohol on the growth of yeast; and it was shown that the presence of so small a quantity of alcohol as one thousandth of one per cent. (two drops to the gallon) caused considerable retardation, which was increased by every additional proportion of alcohol until it reached fourteen per cent., when all growth was arrested. This was the uniform result of fifteen experiments. The second series of experiments was on four healthy, active kittens between one and two months old. They were all treated alike, except to two of them was given daily by means of a stomach pump 1.6 grams of alcohol diluted with water, and to the other two was

given in the same manner the same quantity of pure water. The doses of alcohol were gradually increased uutil they reached 3.6 grams, when plain symptoms of intoxication were produced. The experiment was continued four months, during which the two kittens receiving the alcohol steadily failed in health, while the two receiving only water continued to thrive, and were as sprightly as ever.

Drs. Berkley and Friedenwald, in the Pathological Laboratory of Johns Hopkins University, under the direction of Professor Welch, made some very important investigations concerning the action of alcohol on the leucocytes of the blood and the nerve cells of the brain. The presence of alcohol in the circulating blood greatly diminished the activity of the leucocytes, and caused shrinking or irregularities in the corpuscles with diminished hemoglobin. Many of the nerve cells of both cerebrum and cerebellum were shrunken, and more or less degenerate, and in some places surrounded by paralyzed or dead leucocytes. In 1897, Dr. A. C. Abbott, first assistant in the Laboratory of Hygiene, University of Pennsylvania, reported the results of experiments on rabbits to ascertain the "influence of acute alcoholism or their normal vital resistance to infection." Several healthy rabbits were inoculated with the same proportionate quantity of streptococcus pyogenes. One half the number were given diluted alcohol through a stomach tube, daily, sufficient to produce symptoms of intoxication. To the other half no alcohol was given. The alcoholized rabbits became sick quicker and suffered much more severely than those receiving no alcohol. The same effect was produced after inoculation with the bacillus coli communis; but with the virulent staphylococcus pyogenes aureus there was less difference [see Journal of Experimental Medicine].

Dr. John D. Kales, when demonstrator of histology in the laboratory of the Northwestern University Medical School, Chicago, executed a series of experiments with the spectroscope and microscope on blood drawn by hypodermic syringe from the heart of a living rabbit and mixed with alcohol in varying proportions from one to ten per cent. of the latter. He found when the alcohol in proportions varying from one to five per cent. was mixed with the freshly drawn blood diluted with distilled water, it made no perceptible change in the oxyhemoglobin spectral bands at ordinary atmospheric pressure and a temperature of 98° F. Neither was there any evidence of the oxidation of the alcohol. But when the pressure was diminished by means of the air pump to the extent of 710 millimeters of mercury, the hemoglobin was rapidly reduced by surrendering its oxygen, which did not combine with the elements of the alcohol present, but escaped in

a free state, It was further shown that the rapidity of reduction of oxyhemoglobin was increased by increasing the proportion of alcohol used; and when reduced in contact with alcohol it was less capable of re-oxygenation than when reduced without the presence of the alcohol. In 1894 Dr. I. H. Orcutt, of Owatonna, Minn., published a monograph in which he details the results of several hundred experiments with the sphymograph to show the effects of alcohol on the circulation in healthy persons, and claims that in all cases it diminishes the force and frequency of the heart's action in direct proportion to the quantity of alcohol taken.

Dr. Horatio C. Wood, in his address on Anesthesia, in the International Medical Congress in Berlin, 1890, said: "In my own experiments with alcohol, an eighty per cent. fluid was used, largely diluted with water. The amount injected into the jugular vein varied in different experiments from five to twenty c.c.; and in no case have I been able to detect any increase in the size of the pulse, or in the arterial pressure, produced by alcohol, when the heart was failing during advanced chloroform anesthesia. On the other hand, on several occasions, the larger amounts of alcohol apparently greatly increased the rapidity of the fall of the arterial pressure, and aided materially in extinguishing the pulse."

During the past year Professor Atwater, of Wesleyan University, Conn., conducted a series of experiments on a man confined in a cage with apparatus for determining the amount of nitrogenous and carbonaceous material taken into the system and the amount escaping therefrom. Six experiments were conducted, each continuing four days. In four of them the person took an ordinary mixed diet with coffee; in the other two he took from two to two and a half ounces of alcohol each day instead of an equivalent amount of carbonaceous food. A part of the alcohol was taken with his regular meals, mixed with his coffee, and the remainder was drunk between the meals, diluted with water. [See Bulletin No. 69, U. S. Agricultural Bureau]. Professor Atwater's conclusions are that "the alcohol was oxidized; i. e., burned as completely as bread, meat, and other ordinary foods in the body and in the same way; that in the oxidation, all potential energy of the alcohol was transformed into heat or muscular energy. In other words, the body transformed the energy of the alcohol just as it did that of starch, sugar, and fat; and that the alcohol protected the materials of the body from consumption just as effectually as the corresponding amounts of sugar, starch, and fat." Consequently, he insists that alcohol to the extent of from two to two and a half ounces per day for an adult, must be considered as food and not poison. The

sole object of the experimenter appears to have been to prove that a certain amount of alcohol can be oxidized and thereby converted into carbon dioxide and water with evolution of heat, in the living body, but he explicitly states that he took no note of the effects of the alcohol on the hemoglobin and leucocytes of the blood the functions of the nervous and cerebral structures, or on the more important secreting structures of the body. Consequently he bases his conclusions on a single attribute of food; i. e., oxidation, to the exclusion of all other necessary qualities, apparently forgetting that the adoption of so restricted a basis would compel him to include ether, chloroform, morphine, and many other anesthetic and narcotic drugs in his list of foods; for all of them undergo more or less oxidation in the living body.

The foregoing list of experimental investigations concerning the influence of alcohol on the living body, conducted in this country during the last half century, is sufficient to demonstrate, when correctly interpreted: (1) That ethyl alcohol does not belong, in physiological influence, to the same class as starch, sugar and fat; instead of being digested, assimilated, and converted into natural elements of the blood and tissues, it enters the blood, and circulates through every part as alcohol, the same as ether, chloroform, morphine and other drugs; (2) that it diminishes animal temperature by diminishing the activity of natural metabolism generally, and by lessening the force and efficiency of the circulation; (3) that it lessens the functions of all nerve structures, both sensory and transmitting, and thereby diminishes the acuteness of the special senses, and the activity of mental processes in direct proportion to the quantity of alcohol present; (4) that it impairs the corpuscular elements of the blood, lessens the activity of the leucocytes, and favors tissue degeneration in the direction of fatty, fibroid, and sclerotic changes; (5) that it lessens every force or energy known in a living body; namely, muscular force, nerve force, mental force, heat force, and vital or protoplasmic force, both animal and vegetable.

That the first of these propositions is correct was not only fully demonstrated by both myself and Dr. Hammond in living several consecutive days on nothing but starch and water, doing our daily mental and physical work and maintaining all our bodily functions in their normal condition, while the taking of less than two ounces of alcohol daily, resulted in direct disturbance of nearly all the functions, both physical and mental, but those of Dr. Hammond also demonstrated the presence of the alcohol in the blood and tissues unchanged by its passage through the digestive organs. The same has

also been shown by many chemists in both Europe and America. Therefore the classing of alcohol with starch, sugar and fat, as hydrocarbonaceous food by Liebig, was a most unfortunate error, as it has nothing in common with the three last named except that it is composed of the same three elementary substances. Instead of being a product of vegetable or animal growth or vital evolution like them, it is a toxic product of fermentation; and instead of undergoing digestion and assimilation like them, it enters the blood unchanged and exerts more or less disturbing influence on every function of the living body.

The second proposition, that alcohol diminishes the temperature of the human body, as first demonstrated by me in 1850-51, next by Lichtenfels and Froblick in 1852, by Dr. B. W. Richardson in 1866, and by many others, is no longer disputed by any well-informed parties. The correctness of the third proposition is not only well sustained by the ingenious experiments of Dr. J. H. Kellogg, and some of those of Dr. Cerna, but it is still more amply demonstrated by those of J. J. Ridge, B. W. Richardson, Lauder Brunton, Kraeplin, and others in Europe. The fourth proposition is not only fully justified by the investigations of Drs. Berkly and Friedenwald already detailed, but also by those of B. W. Richardson, Delearde, A. C. Abbott, and by all who have investigated the results of chronic alcoholism.

The fifth and last proposition is a legitimate corollary from all those preceding it, and is sustained by all the experiments showing that alcohol diminishes tissue metabolism, animal heat, nerve sensibility, muscular strength, mental activity, and protoplasmic germination, as detailed by Bocker, Hammond, Richardson, Parkes, Ridge, Hodge, Kellogg, and others too numerous to mention. The inference that I drew from my experiments in 1850-51, that the maintenance of animal heat and the exhalation of carbon dioxide were the direct result of cell or tissue metabolism, and not from the oxidation of alcohol or any other unorganized matter in the blood, has since been more fully demonstrated by the investigations of Fick, Wislicenus, Vort, Pettenkoffer, and Pfluger. Consequently the presence of alcohol in the blood and tissues of the living body, repairs no tissue, and liberates no natural force or vital energy, but by its narcotic or anesthetic properties it diminishes both metabolism and the evolution of all varieties of organic or vital force in direct proportion to the quantity present. And so far as it unites with the free oxygen in the blood it diverts that amount from its action on the organized matter in promoting metabolism, and thereby prevents the natural evolution of more heat than is liberated by its own oxidation. Therefore, it displays none of the attributes, and is capable of serving none of the purposes, of food in the living body; and there are but very few morbid or pathologic conditions for which it can be used with benefit as a medicine; and even for these, other anesthetics, as chloroform and ether, are more efficient.

RUSH MONUMENT FUND.

At the last meeting of the society the secretary was instructed to publish that part of the President's Address of 1900, referring to the Rush Monument Fund together with the action of the society in regard thereto and the names of the members of the committee appointed in accordance with the action of the society. Following is an extract from the address of the President Dr. Gardner:

Some sixteen years ago eleven distinguished physicians conceived a project to build a monument in honor of Dr. Benjamin Rush. They brought the matter before the American Medical Association at Newport, Rhode Island, and received considerable encouragement and support and some money. An organization was effected and a "Rush" monument committe appointed with Dr. Gihon as president. From year to year the chairman has reported progress and money has been coming in slowly until last year the contributions and intererest from investments amounted to $10,000. In his report for 1899, Dr. Gihon says: "At the Philadelphia meeting the sum of $100,000 was fixed by common consent as the amount which should be contributed by the profession to erect a suitable monument." At that time there was a roll call of States, and delegates pledged their several constituencies each for its quota for this commendable project. Colorado and New York each pledged $2,000. A year later these pledges were redeemed; the permanent secretary was directed to communicate with the officers of the State Medical Societies, urging them to appoint without delay, representative members of the committee from the several States and Territories. In answer, six States responded, and $353.50 have been added to the monument fund. When Kansas was called Dr. Daily who was then president of the Kansas Medical Society, and the only delegate present, arose and said he had no authority to bind the Kansas Medical Society for any amount, but Kansas would do her part, and he would guarantee $100.

This money has never been paid, but Dr. Daily feels in duty bound to pay it unless the society takes some action in the premises. I think some action should be taken for I don't see how Dr. Daily could help saying Kansas would do her part. She always has. She always will.

The secretary of the navy has donated one of the best sites in Washington for the monument. We have the site, we have the Rush Monument Committee and $10,000, and we need $90,000 more. Of the eleven men who conceived this project, ten are in their shrouds, Dr. Gihon has been retired from active duty by reason of age, and last year resigned the chairmanship. He says: "After fifteen years of

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persistent, earnest effort the time has come when I must admit, I can do no more. I transfer this duty to some younger, and I hope more successful worker."

Let us consider briefly the life and services of Dr. Rush, one of the greatest among the great men of the American revolution. He was a man who had the courage of his convictions. By advocating and signing the Declaration of Independence he put liberty and life in jeopardy, and for that act a price was set upon his head. Among his early writings he discussed slavery, intemperance and health, and was always advocating and working for the betterment of humanity, and continued in the great work during his whole life. As a physician he was at his best; he was always at his post of duty. During the epidemic of yellow fever in Philadelphia, in 1793, we find him visiting from 100 to 120 patients a day. Through that long terrible winter at Valley Forge when the bravest were becoming disheartened and losing hope, when men were dying from sickness, hunger and cold, Dr. Rush ministered to the needs of the army, and by his sublime personality and character upheld the hands of Washington in the darkest hour of American history. When that ragged, half-starved, half-armed but now disciplined army left their blood stained foot-prints on the march to Trenton, Princeton, Brandywine and Germantown, Dr. Rush cared for the wounded and solaced the dying; and later retired from the army with no recompense save that which comes to full grown souls from the consciousness of duty done. As a statesman he was farseeing and deep thinking and unshaken in his convictions of right. He wrote and worked for the abolition of slavery, because slavery was the opposite of liberty and unjust. Franklin and Rush and a few others advocated the abolition of slavery under the new government, but they were overruled as too radical and impracticable, and Columbia stood before the nations with feet of clay, a Republic founded on two antagonistic ideas, freedom and slavery. The Declaration read: "All men are born free and equal," but meant, "except some who are born slaves." Franklin and Rush did not give up the struggle, but organized the Pennsylvania Society for the Abolition of Slavery, with Franklin as president, and he was succeeded by Rush, and both labored in the cause of freedom until called to come up higher. Time proved the wisdom of Franklin and Rush and their compatriots who would have abolished slavery. Had their counsels been followed the civil war might have been avoided.

How slavery became the bane of this great land and almost compassed its destruction you know. The civil war was the necessary outcome of the failure to abolish slavery. Few realize that the civil

war was the greatest armed conflict of all history. More men were killed in one day under Gen. Grant than have perished in South Africa since that war began; more men were killed in three years than England has lost in battle after 800 years of almost continuous fighting. After four years of war the Declaration of Independence was made to mean what it read and slavery was abolished. That was humanity's contribution to freedom, for men of every race and clime and condition died in defense of the flag. By the out-pouring of treasure, by the sacrifice of health and limb and life the feet of clay were transmoted into enduring bronze, and, thank God, all the bitterness of sectional strife has passed away and we stand one people with one purpose under one flag. Now can we say—

Lift up your eyes my own Columbia.
Lay aside foreboding fears:
In the book of fate 'tis written,
Thy flag shall wave a thousand years.

Dr. Rush was a citizen of the world, a statesman of high order and a man of unflinching courage, and unquestioned integrity. We admire him for his many good and strong qualities; but while he was great in all directions, he was greatest as a physician. We have fraternal feelings and regard for him, and he has peculiar claims on us. He is ours, and by honoring him we honor the medical profession. If the 100,000 regular physicians of this country should take this matter in hand the monument could be built in a few years.

In closing may I not ask the profession of Kansas to honor this great State, to honor yourselves by helping to erect this monument to Dr. Benjamin Rush a representative of the highest type of American manhood; one of earth's greatest physicians, and one of America's most profound and farseeing statesman.

On motion of Dr. W. L. Schenck, those parts of the President's address relating to proprietary medicines were referred to a special committee of three, and those parts relating to a monument to Dr. Rush were referred to a special committee of three.

As a committee on Rush Monument the President appointed. Drs. C. F. Leslie, A. B. Peters, and Andrew Sabine.

The Committee on Rush Monument Fund made the following report which was adopted.

We, your committee on Rush Monument Fund, desire to make the following report: We respectfully recommend, that the nominating committee of the Society, be made a committee to raise funds for said monument. And we further recommend, that in counties not represented by the nominating committee, the President shall appoint one member from each county, not represented by the nominating com-

mittee, to act with this committee in raising said funds, in a manner deemed best by themselves.

Respectfully Submitted

C. F. LESLIE.
A. B. PETERS.
ANDREW SABINE.

The following members of the Society were designated by the President to solicit subscriptions to the Rush Monument Fund in the counties in which they reside:

Anderson, D. O. Taylor, Greely.
Atchison, E. T. Shelley, Atchison.
Barton, R. H. Mead, Great Bend.
Brown, C. P. Shaefer, Morrill.
Bourbon, W. S. McDonald, Fort Scott.
Cloud, W. R. Priest, Concordia.
Clay, R. J. Morton, Green.
Chase, J. P. Shelley, Elmdale.
Cherokee, J. N. James, Columbus.
Crawford, Wm. Williams, Pittsburg.
Douglas, G. W. Jones, Lawrence.
Doniphan, R. S. Dinsmore, Troy.
Decatur, W. B. Mead, Oberlin.
Elk, W. H. Smethers, Moline.
Edwards, Geo. M. Seacat, Kinsley.
Ellsworth, H. O'Donnell, Ellsworth.
Dickenson, H. H. Sutherland, Herrington.
Coffey, W. H. Mathis. Waverly.
Ford, T. L. McCartha, Dodge City.
Leavenworth, J. A. Lane, Leavenworth.
Jefferson, Maggie L. McCrea, Winchester.
Johnson, S. F. Green, Olathe.
Jewell, A. B. Peters, Mankato.
Greenwood, D. W. Basham, Neal.
Geary, P. Dougherty, Junction City.
Linn, D. E. Green, Pleasanton.
Lane, D. L. Wood, Dighton.
Lyon, D. F. Longenecker, Emporia.
Miami, G. A. Boyle, Louisburg.
Labette, J. H. Kleiser, Parsons.
Lincoln, J. F. Pickerel, Beverly.
Harvey, J. T. Axtell, Newton.
Franklin, J. D. Bryan, Ottawa.

Washington, M. N. Gardner, Greenleaf.
Ness, Arthur C. Allen, Utica.
Republic, W. F. Howard, Cuba.
Wyandotte, J. E. Sawtell, Kansas City.
Shawnee, L. H. Munn, Topeka.
Reno, S. H. Sidlidger, Hutchinson.
Riley, W. D. Silkman, Manhattan.
Wichita, G. F. Johnson, Leoti.
Mitchel, F. M. Daily, Beloit.
Sheridan, J. J. Stephan, Seldon.
Stafford, G. W. Akers, Stafford.
Wilson, J. L. Morhead, Neodesha.
Neosho, W. E. Barker, Chanute.
Smith, B. W. Slagle, Smith Center.
Marion, O. J. Furst, Peabody.
Sumner, Melvin Collins, Oxford.
Potowatomie, E. L. Simonton, Wamego.
Nemaha, S. Murdock, Oneida.
Montgomery, W. H. Wells, Coffeyville.
Ottawa, C. C. Surber, Delphos.
Osage, F. E. Schenck, Burlingame.
Rice, P. P. Truehart, Sterling.
Sumner, W. M. Martin, Wellington.
Saline, J. E. Miller, Salina.

TOTAL EXTIRPATION OF URINARY BLADDER.

J. WESLEY BOVEE in American Medicine.

The following conclusions may be drawn from a study of total extirpation of the urinary bladder: 1. Until a more satisfactory plan of disposal of the ureters is found, cystectomy should never be undertaken, for conditions other than extrophy, when partial extirpation of the organ is possible. Even a very small portion of the bladder into which the ureters may be debouched is practically free from the great danger of infection incident to bowel grafts, and further, such disposition of the ureters is more easily executed. 2. For exstrophy the Maydl and the Pozzi operations are quite satisfactory, though the danger of infection seems ever present. 3. Rectal graft of the ureters in its continuity and skin-grafting of this duct are highly dangerous. 4. Ureterovaginostomy is practically free from ascending infection, though it gives far from perfect results. 5. The urethral graft of the ureter seems free from infection, but the constant dribbling of the urine is but slightly ameliorated by the use of a urinal. 6. The Mauclaire Gersuny operation is worthy of a further application, inasmuch as it provides for both sphincter bladder and bowel.

The Family Laxative.

The ideal safe family laxative, known as Syrup of Figs is a product of the California Fig Syrup Co., and derives its laxative principles from senna, made pleasant to the taste and more acceptable to the stomach, by being combined with pleasant aromatic syrups and the juice of figs. It is recommended by many of the most eminent physicians, and used by millions of families with entire satisfaction. It has gained its great reputation with the medical profession by reason of the acknowledged skill and care exercised by the California Fig Syrup Co. in securing the laxative principles of the senna by an original method of its own, and presenting them in the best and most convenient form. The California Fig Syrup Co. has special facilities for commanding the choicest qualities of Alexandria senna, and its chemists devote their entire attention to the manufacture of the one product. The name—Syrup of Figs—means to the medical profession "the family laxative, manufactured by the California Fig Syrup Co.," and the name of the Company is a guarantee of the excellence of its product. Informed of the above facts, the careful physician will know how to prevent the dispensing of worthless imitations when he recommends or prescribes the original and genuine Syrup of Figs. It is well known to physicians that Syrup of Figs is a **simple, safe** and **reliable** laxative, which does not irritate or debilitate the organs on which it acts, and, being pleasant to the taste, it is especially adapted to ladies and children, although generally applicable in all cases. Special investigation of the profession invited.

Syrup of Figs is never sold in bulk. It retails at fifty cents per bottle, and the name, Syrup of Figs, as well as the name of the California Fig Syrup Co. is printed on the wrappers and labels of every bottle.

CALIFORNIA FIG SYRUP CO.

San Francisco, Cal.

Louisville, Ky. ✦ ✦ New York, N. Y.

EDITORIAL.

The Stormont Library will soon be in condition to allow all members of the society to take out books. Members of the three state societies only will be accorded this privilege.

We would like to have reports of the meetings of the various county and district societies and will be glad to publish the papers presented if the Secretaries will kindly send them in.

The Section Secretaries are beginning in good time this year and a good program is assured. If you have not recieved an invitation to write a paper and desire to do so, send title of paper to the Secretary of the Section in which it should appear.

Dr. S. W. Williston, of Lawrence, and Dr. Geo. W. Hogeboom, of Topeka, have been appointed delegate and alternate to tne meeting of the Committee on National Legislation of the A. M. A. which will be held at an early date in Washington, D. C.

THERE ARE OTHERS.

The New York State Journal of Medicine is having difficulty with the Postoffice Department and is requesting its members to send it subscriptions. Unless they succeed better than we have, they will have to pay postage at the rate of one cent each.

PRESIDENT'S ANNUAL ADDRESS.

BEFORE THE ANNUAL MEETING OF THE SHAWNEE COUNTY MEDICAL SOCIETY.

Ladies and Gentlemen of the Shawnee County Medical Association: The year I have had the honor as well as the pleasure of presiding over your deliberations, has been one of great profit to me and I trust each of you have derived equal benefit. It is not uncommon for a retiring officer to point with pride to the marvelous feats he has accomplished. While our society has made phenomenal progress all credit is due to the members for the many scientific papers they have produced, and the intelligent and dignified manner in which discussions have been conducted, and, above all, you are to be congratulated upon the fact that there has been no jealousy or petty strife, fear or appre-

hension of superiority throughout the past year's deliberations. To me this fact alone will ever be a delightful reminisence and I sincerely hope and believe the future of this association will be marked not only for its scientific attainments, but for its harmony and good will, one for another, with such generous friendship as Emerson describes when he says, "I rely upon him as I do upon myself, and I care not whether he says it is this or thus, I know it is right." We should use our best endeavors to foster this kind of a spirit, it will cement and strengthen our organization, and at once command the respect and admiration of the public. This should be the lesson of our life, if practiced with zeal it will help to remove the stumbling blocks that heretofore have been, and always will be, a barrier to success. Moreover, if harmony and friendship are essential to the success of any organization, it is especially so with us, for in all this broad land there is no profession that has so many obstacles to surmount, so many difficulties to overcome as does the regular profession of medicine. Every hour during the day the land is flooded with literature, describing the marvelous cures accomplished by homeopathy, Christian Science, faith cure, osteopathy, and their kindred dilusions. How long will it take mankind to learn that while they are giving ear to those fallacies, the regular profession of medicine are solving the problems that contribute so much to health and happiness? I sometimes think we should be more strenuous in our efforts to educate the public, to open their eyes to the great purpose and end of our profession, for it is only through the enlightened sentiment and actions of the medical profession that the community can be brought to appreciate our great work, which no longer consists so much in drugging as it does in hygienic rules properly enforced, fresh air, pure water, change of air, travel, attention to diet, good and appropriate food. Notwithstanding the numerous advocates of pseudo therapeutics our progress is uninterrupted and it may be said that preventative medicine as taught by our profession today, is doing ninety per cent. of all the work directed toward the stamping out of disease and while the intelligent public stand amazed at our progress, there are myriads of people who can not or will not comprehend. Thus it will be seen our work is not finished, nor will it ever be, as our science is so deep and so profound that it knows no limit. Ladies and gentlemen, we are upon the last leaf of the calendar that marks the first year's history of our association. In conclusion I wish to thank you for the support you have given me and for the courtesies you have shown me while I have served you as best I knew how. I am keenly conscious that I have not made you a very brilliant official, I beg that you throw the mantle of charity over my short-

comings and sincerely hope that my successor may profit by my errors. I hope that I may have the privilege of meeting with you during the months and years to come and that I may be allowed to participate in your deliberations and in that pleasing anticipation as your chairman, I bid you good-bye.

MISCELLANEOUS.

ARTIFICIAL MILKS.

Louis Koplinski (Medical News) says that in composing an artificial milk the following conditions were considered: That it should approximately represent all of the component parts of the animal secretion. That the percentages of salts and of water are of vital importance. That the product should be cheap and readily and rapidly prepared. That the ingredients should be easily obtained. That they should be fresh and sterile and that the mixture be palatable. These requisites are fulfilled in the following general formula: Extract of malt (sirupy), one tablespoonful; olive oil, one tablespoonful; roasted flour, two teaspoonfuls; one broken raw egg. Beat up in a bowl or dish with a spoon or eggbeater for three or four minutes. Add by degrees while stirring a tumbler or gobletful of pure cold drinking water. Season with tablesalt. To be taken one or two hours after meals. In hot weather add crushed ice or prepare the whole in a "milk-shaker."

As is apparent, the extract of malt is used to emulsify the oil and for its diastatic effect upon the flour. The malt should be of thick consistency. The olive oil represents the fat of milk. The egg, the albuminoids, fat and salts of the natural fluid. The tablesalt is added for its digestive effect and to improve the taste of the compound. The roasted flour after conversion into dextrine and maltose replaces the lactose of milk. The proportion of water is necessary for proper digestion and ready absorption.

This general formula is varied and modified in numerous ways, according to the circumstances and indications of any particular case. The flour may be increased in amount or diminished or omitted. Increased for its soothing effect in intestinal disease, dispensed with where a carbohydrate is not indicated. The olive oil may be replaced by any other fixed oil or fat. Of the former class cod-live oil deserves particular mention. Not alone for its great therapeutic-dietetic value, but because it has been found that thus administered it is very readily taken and that the great heat spells of summer are not at all an objection to its persistent use. Other more or less eligible substitutes

for olive oil are the fixed oils of cottonseed, rapeseed, sweet almonds, poppyseed and peanut.

Of fats, unsalted butter and chocolate, a heaping teaspoonful of the first and two heaping teaspoonfuls of the second, will be found useful. In a chocolate milk, of course, the roasted flour is needless. The chocolate should be grated or in a fine powder form.

The flavor of these artificial milks is rich and the after-taste pleasant. They produce the agreeble, general sensation of normal digestion. They are restoratives for minor forms of temporary exhaustion, muscular or mental. They produce feelings of composure and confidence. The subject's mind and manner, nerve and decision are at their best, and mother's milk can be replaced by the artificial milks in infant feeding.

STATE SUPERVISION OF MARRIAGE.

Journal American Medical Association.

W. H. Heath, Buffalo, proposes that license to marry shall be based upon three certificates, as follows:

A. Certificate of Health and Heredity.—This should be furnished by the family physician, or, in the absence of such, by any reputable physician. It should contain certain data covering the family history, such as: 1, age and cause of death of immediately preceding ancestors; 2, the existence of predisposition to insanity, tuberculosis, cancer or other transmissible diseases; 3, of any preceding illness bearing upon present or future health.

B. Certificate, Either Special, Qualifying or Educational.—This certificate should be issued upon, and represent attendance—with or without final examination—upon a short, practical common sense course of free lectures; these to be given preferably at night, delivered under the auspices of the municipality, town or village, at some convenient place, such as the high school, academy, court room, church lecture room, etc., by a suitably qualified person—matron for the females, master for males. These courses should be adapted to each sex, and should include in a general way didactic instruction, and when indicated and practicable, should be supplemented by demonstrations in the following subjects: 1, outlines of physiology of infancy, childhood, puberty; 2, function of sex, sexual life, its care and abuse; masturbation, menstruation, childbirth, reproduction, growth and development; 3, personal hygiene, physical and mental development; 4, venereal disease, and those due to violation of sexual laws; 5, domestic and household economy, domestic hygiene and san-

itation; 6, alcoholism and tobacco, and 7, morality and the moral sense. The scope could be determined by a committee of educators, composed say, of a school principal, a medical man, a lawyer, or some prominent citizen. These lectures should be modified, greater emphasis being given to that which relates respectively to each sex, and include additionally such other pertinent matter as will be conductive to good citizenship, enlightenment in civic affairs, and a high moral standard.

C. Certificate of Ability.—1, Evidence of capability of support, that the parties themselves and their offspring will not be a care upon the community; 2, evidence that the individual is not an habitual criminal, when such evidence seems to be indicated.

IMMEDIATE AND REMOTE EFFECTS OF BRAIN INJURY.

Journal American Medical Association.

D. S. Fairchild, Clinton, Iowa, concludes from his study of a series of cases that:

1. Violence of no great intensity when applied to a limited area of skull may cause a fracture with only momentary displacement with a rupture of a meningeal artery, or a rupture of an artery without fracture.

2. A localizing injury, which may lead to a fracture without displacement and hemorrhage, does not as a rule, cause a serious permanent brain lesion if early and judicious treatment is employed.

3. A fracture may occur without apparent displacement, yet a real localized pressure on the brain exists which may cause irritative changes involving a more or less extended sclerosis and remote secondary results, as epilepsy or mental impairment.

4. A blow may be received on the head which may produce a more or less extensive laceration of the scalp which in itself is not serious. But the fall from a height or from a rapidly moving train may produce more or less extensive contusion or laceration of brain tissue leading to serious immediate or remote effects.

5. A fall from a height or moving train may, without a fracture, cause directly or indirectly a contusion or laceration of brain tissue or so disturb the cerebro-spinal fluid as to primarily bring about such changes and cause immediate results or secondary serious remote effects by inducing degeneration and final interstitial changes producing insanity.

6. An injury may be of such a character as to produce a localized wound of the brain that may heal with the production of scar tissue

which may extend, may or may not undergo cystoid or other degeneration with serious remote effects.

7. In the absence of localizing or other definite symptoms, to indicate the nature of the lesion, the character of the accident and the manner in which the force is applied is of great value in reaching a conclusion as to the probable nature of injury to the brain.

AUTOCYSTOPLASTY AND KOLPOCYSTOPLASTY IN MARKED DEFECTS OF THE VESICO-VAGINAL WALL.

Philadelphia Medical Journal.

WITZEL (Centralblatt fur Gynakologie) emphatically condemns the operation of kolpokleisis for the cure of gross defects of the vesico-vaginal wall, on the ground of the ultimate development of serious complications which result from infections originating in the retained vaginal secretions. He remarks that the bladder very shortly becomes the seat of a chronic cystitis, which sooner or later extends up the ureters to the kidneys. The end is a septic pyelonephritis. He describes the case of a woman, 46 years of age, who presented a marked vesico- vaginal fistula, in which three unsuccessful attempts had been made to close the opening, which had resulted from attempts at the removal of a myomatous uterus. His examinations of the patient convinced him that there was a possibility of intravesical transplantation of the ureters, and he resorted to an extensive kolpocystoplastic operation to remedy the defect. Full exposure of the seat of the operation was obtained by digital extraction of the anterior vaginal wall and the use posteriorly of a large-sized speculum. It was found that the destruction of tissue had involved the posterior wall. By means of the finger the bladder was loosened from the surrounding tissues after a transverse incision had been made in the vaginal wall and the organ thus rendered more accessible for the further necessary manipulations. Slight traction was then successfully exerted upon the posterior wall, which was drawn forward to cover the deficiency in the anterior tissues, a few stitches then sufficing to bring the parts into active apposition, Lembert's sutures being applied for this purpose. A large-sized Nelaton catheter was introduced into the urethra and retained in position for a few days. The wound made an uninterrupted recovery. There was but little discharge from the vagina following the operation.

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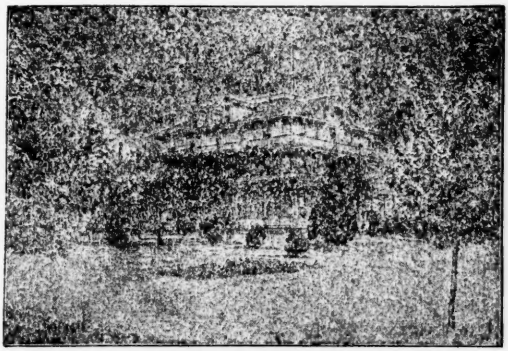

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